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FRANCIS BAILY, Esq., President, in the Chair.

The following communications were read :—

I. Observations of the Comet of Faye.

1. Observations made at Starfield. By W. Lassell, Esq.

These observations were communicated in letters, dated Feb. 6 and March 7; and the following is a tabular statement of them :—

Day.	Mean Solar Time.	Right Ascension of Comet.	Declination of Comet.	No. of Obs.	Stars of Comparison.
1844. Jan. 12	^h ^m 11 24	^h ^m ^s 5 8 47 ^o	^o ['] ^{''} + 3 36 35	2	23 Orionis and * (c).
13	9 7	5 8 56 ^o ·1	3 40 33	1	* (c).
15	8 30	5 9 25 ^o ·6	3 49 30	1	* (d).
22	7 45	5 11 58 ^o	4 27 32	1	* (e).
25	8 34	5 13 27 ^o ·6	4 46 2	1	8 Monocerotis.
Feb. 19	9 46	5 34 41 ^o ·5	7 32 58	2	α Orionis.
22	8 52	5 38 2 ^o ·3	+ 7 52 22	2	α Orionis.

The following information respecting the above observations, and those contained in the *Monthly Notice* for January last, has been furnished by the author.

They were made with a power of 96 on a micrometer eye-piece applied to the 9-foot Newtonian reflector. The micrometer has two stout parallel wires permanently fixed at right angles to the moveable and parallel spider's lines, their internal edges being about 8" apart. One revolution of the micrometer is assumed to be = 18".298. The interval of the transits of the comet and star over the thick wire was observed, the comet being so placed in the field that its nucleus should be concentric with the large zero-hole of the micrometer, and the distance in space between the zero and the star of comparison was measured with the micrometer. The comet has been throughout compared with one or other of the stars 23 Orionis, 30 Orionis, α Orionis, and 8 Monocerotis, either directly, or indirectly by means of intermediate telescopic stars.

In all cases, the author has communicated the intervals in time and the distance in N. P. D. in revolutions of the micrometer between the comet and the stars of comparison. The assumed places of the above-mentioned stars are as follows:—

23 Orionis	1843 Dec. 12	R.A. = 5 ^h 14 ^m 40 ^s .3
		Decl. = +3° 23' 22".4
30 Orionis	Dec. 22	R.A. = 5 ^h 18 ^m 42 ^s .0
		Decl. = +2° 57' 20".2
8 Monocerotis	1844 Jan. 25	R.A. = 6 ^h 15 ^m 32 ^s .4
		Decl. = +4° 40' 3".7

The place of α Orionis is taken from the *Nautical Almanac*. In some instances, the distance in declination between the comet and one of the above-mentioned stars was measured intermediately by two and sometimes by three telescopic stars. The observations are not corrected for the effects of refraction and parallax.

2. Right Ascensions and North Polar Distances of the Comet of Faye, from Observations at the Royal Observatory, Greenwich. Communicated by G. B. Airy, Esq. Astronomer-Royal.

Day of Observation.	Mean Solar Time for R. A.	True Right Ascension of Comet.	No. of Obs. in R. A.	Mean Solar Time for N.P.D.	True N.P.D. of Comet.	No. of Obs. in N.P.D.	Remarks.
1843. Nov. 29	^h ^m ^s 12 30 46	^h ^m ^s 5 21 36.05	14	^h ^m ^s 12 38 40	[°] ['] ["] 84 25 36.0	11	Meridian Observation with the mural circle.
	.....	.....	...	12 48 37	84 25 32.1	1
	17 33 9	5 21 28.19	6	17 33 9	84 28 9.9	6	
Dec. 11	9 1 7	5 15 59.50	7	9 1 7	86 8 25.2	7	
1844. Jan. 15	14 4 37	5 13 58.87	7	14 28 14	86 31 40.1	1	
	9 55 30	5 9 24.43	2	9 54 10	86 9(32.6)	1	Meridian Observation with transit instrument and mural circle.
	22 8 17 27	5 11 55.62	6	8 16 29	85 33 5.1	5	
	26 11 29 0	5 14 (4.00)	2	11 29 0	85 7(19.0)	2	
Feb. 8	8 11 30	5 23 39.71	1	8 11 30	83 42 24.7	1	
	19 11 46 9	5 34 45.58	2	11 46 9	82 26 38.9	2	
	20 8 41 32	5 35 46.15	6	8 44 20	82 20 26.8	5	
	22 8 18 13	5 38 2.19	10	8 12 26	82 8 1.1	6	

The above observations, with the exceptions mentioned in the remarks, were made with the south and the east equatorials of the Observatory, the observations of Nov. 29 and Dec. 11 being made with the latter and all the rest with the former instrument. In general, the observations consisted of comparisons, in the same position of the polar axis of the instrument, of the comet with neighbouring stars in both elements, the differences of right ascension of the star of comparison and the comet being determined by the time of their transits across the declination-wire, and the differ-

ence of north polar distances by the reading of the declination circle of the east equatoreal, and of the sector-arc of the south equatoreal. The only exceptions to this rule are the results of Jan. 15 and Jan. 26, 1844 (included in brackets), which depend on the readings of the hour-circle and declination-circle of the south equatoreal, and which may be affected with errors of 3^s or 4^s in right ascension, and of $1'$ in north polar distance.

The results have been rigorously cleared of the effects of refraction and parallax, the distances of the comet from the earth being taken from an ephemeris, by Professor Henderson, in the *Monthly Notice* of this Society for January last, as far as it extends.

The places of the stars of comparison have been taken either from the Catalogue of Santini, contained in Vol. XII. of the *Memoirs* of this Society, or from meridian observations made since at the Royal Observatory. The only element which is at all doubtful is the right ascension of the star of comparison for the observations of Feb. 20, which has been deduced from the time of its transit across the central wire of the telescope of the mural circle. It is believed that this determination is not in error to the amount of 1^s , and the result may be used without scruple at this stage of the correction of the orbit. On Feb. 19, 20, and 22, the comet was excessively faint, and it required a great deal of caution to observe it. The single results are, however, for those evenings, on the whole very consistent, the north polar distances observed on Feb. 22 being subject to greater uncertainty than the rest. It was extremely difficult to bring the comet to the equatoreal wire of the instrument on that evening, though the times of transit on the same evening were observed with tolerable accuracy.

3. Right Ascensions and Declinations of the Comet of Faye, observed with the Equatoreal at the Observatory of Trinity College, Dublin, 1844. By Mr. Charles Thompson, Assistant. Communicated by Sir W. Hamilton.

Day.	Sidereal Time.	Right Ascension.	Declination.
1844.	h m s	h m s	° ' "
Jan. 10	4 3 46	5 8 33.0	+ 3 25.8
12	4 4 12	5 8 50.0	3 36.1
13	4 15 49	5 8 55.9	3 41.0
14	5 46 0	5 9 8.4	3 47.3
15	4 15 3	5 9 26.6	3 50.4
18	5 2 20	5 10 18.4	4 5.5
22	6 13 22	5 12 1.6	4 27.4
23	6 10 19	5 12 25.2	4 34.9
24	5 55 49	5 12 54.3	4 40.8
25	6 1 51	5 13 27.6	+ 4 46.6

4. Observations of the Comet of Faye. By C. Rumker, Esq.
Communicated by Dr. Lee.

Day.	Mean Time at Hamburg.	App. Right Asc. of the Comet.	App. N. Dec. of the Comet.	Number of Observations and Remarks.
1843. Dec. 1	^h 10 ^m 33 ^s 46 ^o	80° 11' 55 ^{''} 78	5° 14' 44 ^{''} 4	14
1	12 39 53 ^o 3	.....	5 13 52 ^o 2	Merid. Circle.
9	10 41 9 ^o 4	79 14 42 ^o 9	4 4 39 ^o 1	10
9	12 4 46 ^o 2	.....	4 4 30 ^o 6	Merid. Circle.
10*	9 52 15 ^o 2	79 7 18 ^o 7	3 58 8 ^o 2	22
11	9 51 5 ^o 1	79 0 7 ^o 7	3 51 37 ^o 2	17
13	8 30 46 ^o 5	78 45 45 ^o 1	3 39 56 ^o 7	12
15	11 45 26 ^o 0	78 30 22 ^o 4	3 29 11 ^o 2	11
15	12 17 58 ^o 0	.....	3 28 40 ^o 8	Merid. Circle.
16	8 23 31 ^o 7	78 24 44 ^o 3	3 25 0 ^o 7	1: doubtful.
17	8 4 49 ^o 6	78 18 3 ^o 7	3 20 42 ^o 1	17
1844. Jan. 21	8 8 0 ^o 4	77 52 12 ^o 9	4 20 55 ^o 1	2
21	10 10 4 ^o 2	.....	4 12 26 ^o 9	Merid. Circle.
22	9 45 31 ^o 6	77 59 21 ^o 5	4 28 1 ^o 3	18
23*	9 58 8 ^o 4	78 6 39 ^o 7	4 33 58 ^o 1	14
26	8 18 15 ^o 5	78 30 11 ^o 1	4 52 7 ^o 2	3

5. Observations of the Comet of Faye made at the Observatory, Durham; Lat. North $54^{\circ}46'6''$; Long. West $6^m 18^s$. Communicated by the Rev. Temple Chevallier.

The equatoreal telescope employed is by Fraunhofer, of 6.375 inches aperture and of about 9 feet focal length. The magnifying power was 65; and, as the comet would generally bear no illumination, the observations were made with a double ring micrometer.

As a perfect observation of this kind gives eight instants of contact of the comet with the outer and inner circumferences of the rings, and as many for a star which crosses the same field, it determines their difference of right ascension with considerable accuracy. But it does not generally give the means of ascertaining their difference of declination with the same precision. Hence the right ascensions are more accurate than the declinations.

The comet was observed four times on the meridian with a transit instrument. The telescope has an aperture of 3.2 inches, and is of about 4 feet focal length; a power of 60 being employed. It has upon its axis a circle of 2 feet diameter, furnished with two microscopes.

* The observations marked with an asterisk are believed to be the best. The meridian observations are, owing to the necessity of partly illuminating the field, not so much to be relied on.

As the comet would bear no illumination upon the meridian, its declination could be obtained only by estimating when it was in the middle of the field, and its right ascension by observing the time when it quitted the field of view. Both determinations were consequently only approximate.

When it was possible, the comet was referred to a star which crossed the same field. At other times, it was referred to a known star near to it.

The following is a synopsis of the observations :—

Day.	Greenwich Mean Solar Time.	Right Ascen. of Comet.	Declination of Comet.	No. of Obs.	Stars of Comparison.	Remarks.
1843. Dec. 1	h m 9 40	h m s 5 20 47.44	+ 5° 16' 30"	3	.....	Uncertain.
2	9 6	20 22.07	5 6 10	2	Anonymous	
4	10 51	.....	4 39 22	1	.....	Very uncertain.
11	9 12	15 56.06	3 50 43	4	γ Orionis	
12	10 6	15 25.20	.....	2	.....
13	8 26	15 0.90	3 42 51	5	.....
15	11 33	14 0.35	3 30 25	6	23 Orionis	
21	9 6	11 27.40	3 6 16	3	Ditto	
24	8 30	10 28.00	3 1 0	1	.....
26	7 48	9 50.10	3 0 56	4	$\left\{ \begin{array}{l} \epsilon \text{ Orionis} \\ \Delta \text{ Orionis} \end{array} \right.$	
27	9 58	9 33.30	3 3 1	4	ϵ Orionis	
1844. Jan. 18	9 37	10 34.70	4 17 38	2	Ditto	$\left. \begin{array}{l} \text{Only ap-} \\ \text{proximate.} \end{array} \right\}$
23	9 38	12 32.30	4 33 49	3	Ditto	
24	11 55	12 59.10	+4 41 24	2	Ditto	

All the declinations are subject to some uncertainty. On Dec. 2, the comparison-star was observed on the meridian, and its right ascension was found to be $5^h 23^m 28^s.94$, and its declination $+5^\circ 11' 5''.21$.

6. Observations made at Hartwell, Bucks. By the Rev. J. B. Reade. Communicated by Dr. Lee.

II. Elements of the Comet of Faye. By Professor Henderson.

From observations made at Cambridge on December 16 and January 15, and at Greenwich on February 8, the following elements of the comet's orbit have been obtained, which are likely to be more correct than those formerly given :

Epoch of Mean Anomaly for December 31, 1843, {	
Mean Noon at Greenwich	$\left. \begin{array}{l} 11^\circ 32' 14'' \\ 43^\circ 39' 46'' \\ \sin. \quad 34^\circ 0' 38'' \end{array} \right\}$
Longitude of Perihelion.....	
Eccentricity	

Log. of Semi-axis Major $0^{\circ}56'53.3$ Mean Daily Motion $503''52$ Time of Revolution $7^{\circ}0468$ sidereal years.Longitude of ascending Node $211^{\circ}59'12''$ Inclination $11^{\circ}28'48''$

Motion direct.

Ephemeris for 8^h Mean Greenwich Time.

Day.	Right Ascension.	Declination.	Distance from	
			Sun.	Earth.
1844. Feb. 8	^h ^m ^s 5 23 36	$+6^{\circ}18'$	2'008	1'325
12	5 27 32	6 45	2'029	1'380
16	5 31 36	7 11	2'051	1'437
20	5 35 52	7 37	2'073	1'495
24	5 40 20	8 2	2'096	1'555
28	5 45 4	$+8^{\circ}27'$	2'118	1'616

T. HENDERSON.

Edinburgh, Feb. 14, 1844.

III. Elements of the Comet of Faye. By J. R. Hind, Esq. Communicated by the Rev. R. Main.

The following elliptical elements were computed from the Paris observation on Nov. 24, an observation at Hamburg on December 17, and one at Kensington on January 15. The corrections for parallax and aberration were applied according to the method described by Gauss in the *Theoria Motus Corporum Cælestium*. The longitudes were reduced to the mean equinox on the 1st January, 1844. The data employed in the calculations stand as follows:—

Greenwich Mean Time.	Comet's Geocentric Longitude.	Comet's Geocentric Latitude.	Earth's Heliocentric Longitude (corrected).	Log. Rad. Vect. of Earth (corrected).
1843. Nov. 24 ^h 70 ^m 51 ^s 100	$80^{\circ}29'39''.8$	$-16^{\circ}38'54''.8$	$62^{\circ}19'15''.1$	9.9942268
Dec. 17 ^h 30 ^m 89 ^s 757	77 34 51.4	19 36 39.5	85 16 14.0	9.9929530
1844. Jan. 15 ^h 55 ^m 21 ^s 604	76 36 59.6	$-19^{\circ}1'16''.5$	115 4 10.1	9.9929275

Hence the following elliptical elements:—

Epoch 1844, January 1^d 0 Greenwich Mean Time.

Mean Anomaly	$9^{\circ}56'36''.67$	} From the Mean Equinox.
Longitude of Perihelion on the Orbit	53 19 52.4	
Longitude of Ascending Node.....	208 24 18.3	
Inclination	11 7 8.7	
Angle of Eccentricity	31 54 52.15	